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DEVELOPMENT OF A MODEL TO PREDICT RECRUITER SUCCESS (INITIAL RESULTS)

by

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September 1995

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This report documents research that was sponsored by the Research and Plans Division of the Program Analysis and Evaluation Directorate of the U.S. Army Recruiting Command (USAREC) from May 1993 through September 1994. The goal of this research was to develop a decision-support system to assist in the selection of Regular Army (RA) recruiters.

The research approach used the psychological-testing method to measure the sales ability (as a critical characteristic necessary for recruiter success) of recruiters and assemble a database to support the development of a multi-linear-regression model to predict recruiter success by the avoidance of failure. The Measure of Recruiter Effectiveness (MORE) taken for this work was the probability that the recruiter was successful in meeting an assigned quota in any one month.

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1 Introduction

This report documents research that was supported by the Research and Plans Division of the Program Analysis and Evaluation Directorate of the U.S. Army Recruiting Command (USAREC), Fort Knox, KY from May 1993 through 30 September 1994. The basic goal of this research was to develop a decision-support system (essentially a model plus an appropriate database) to assist in the selection of Regular Army (RA) recruiters. Ancillary research on this subject has been conducted by Professor Glenn F. Lindsay of the Operations Research Department of the Naval Postgraduate School (NPS) and is reported elsewhere (see Lindsay [1994]).

The research approach has been to use psychological-testing methods to measure the sales ability (as a critical characteristic necessary for recruiter success) of recruiters and assemble a database to support the development of a multiple-linear-regression model to predict recruiter success by avoidance of failure. The Measure Of Recruiter Effectiveness (MORE) taken for this work has been the probability that the recruiter is successful in meeting an assigned quota in any one month (see Section 2.5 below). Although the appropriateness of this MORE has changed since the inception of the work reported here, the methodological approach developed here would still be applicable in almost all foreseeable circumstances. In particular, the authors believe that it would be very useful for USAREC's "Recruit-the-Recruiter" Program.

Two student theses have supported this research, namely

1. Todd A. Buchs (CPT, USA), **"Validation and Justification of the Use of a Sales-Aptitude Test for US Army Recruiter Selection,"** M.S. Thesis in Operations Research, Naval Postgraduate School, Monterey, CA, June 1994,

and

2. Alejandro S. Hernandez (CPT, USA), **"Design of a Predictive Recruiter Success Model (PRiSM),"** M.S. Thesis in Operations Research, Naval Postgraduate School, Monterey, CA, September 1994.

The interested reader can find virtually complete details (e.g. copy of sales-comprehension test, most sample data, at least examples of all key parts of the recruiter database (including all test-score results), virtually all statistical-analysis results, etc.) in these theses. Consequently, it would seem appropriate to have the report at hand be more of an executive summary in content and style of presentation than of a detailed, technical report.

The primary limitation of the work at hand is that it used the so-called "current employee" method of testing U.S. Army recruiters and of validating the model subsequently developed. Although the results achieved concerning model validity were extremely positive, the sample of recruiters was biased, since basically only surviving successful ones were tested. Consequently, it is recommended that the (so-called) "follow-up" method (see Section 2.6 below) of sampling/validation be used (whenever feasible) in future work, since USAREC does not currently possess appropriate data to develop an entirely valid model to predict recruiter success.

1.1 Background

The U.S. Army Recruiting Command (USAREC) is responsible for recruiting and processing enlistees into the U.S. Army. With the advent of the all-volunteer force, its mission has attained particular significance, since volunteer accessions are now the only kind of personnel influx into the Army. With the end of the Cold War and the downsizing of Department of Defense (DOD) in general and the Army in particular, it has become imperative that the recruiting process be an efficient one.

The key element of the recruiting process/system is the individual Army recruiter (typically a sergeant (i.e. either an E5 or an E6)), since it is he who makes personal contact with a prospective enlistee and "sells" him/her the idea of an Army career. Army recruiters recruit both Regular Army (RA) and U.S. Army Reserve (USAR) enlisted personnel. However, only RA recruiters are used to recruit RA personnel, and only USAR recruiters are used to recruit USAR personnel. Army (both Regular Army (RA) and U.S. Army Reserve (USAR)) recruiters are selected (literally "drafted") from among the ranks of available E5s and E6s, although there are some volunteers (apparently significantly more for USAR recruiters than for RA recruiters). Moreover, according to USAREC [1994], the current recruiter-selection process has apparently not been entirely successful, since (1) not all recruiter selectees successfully complete the preliminary Recruiter School and (2) not all those who do successfully complete Recruiter School become successful recruiters (e.g. consistently meet their recruiting quotas).

In either case, the sergeant's Army career may be damaged (frequently, destroyed), and the Army may lose (loses) an otherwise very effective Non-Commissioned Officer (NCO)(recruiters are selected from the top ten percent of personnel). In essence then the process of selecting Army recruiters themselves (as well as that of managing those E5s and E6s who do become recruiters) is an inefficient one. Currently, USAREC does not have any methodology, tool, or model to aid in the selection of recruiters in order to make it a more efficient process.

Moreover, there are some significant differences between RA and USAR recruiters. RA recruiters are rotated (serving a three-year tour of duty) in a given U.S. Army Recruiting Station (the RA recruiter returning to his previous RA career, e.g. to serve in his primary Military Occupational Specialty (MOS)), while USAR recruiters are permanently assigned to stations located near their permanent civilian residences. More importantly, RA recruiters are drawn from a population of career soldiers (i.e. those whose primary orientation has been to make a career out of the Army), while USAR recruiters are drawn from one of "week-end warriors" (i.e. those whose primary orientation has been towards a civilian career, with military service being a secondary aspect). Thus, even while recruiting, the RA recruiter undoubtedly does not loose sight of his MOS to which he will eventually return. Selling is not the long-range focal point of his life. He has been, is, and will again be a "warrior."

1.2 Problem Statement[1]*

* In this study we sought to determine whether data currently available to USAREC will support the development of a model that predicts (1) whether a particular recruiter selectee has a "good chance" of completing Recruiter School and (2) whether a particular individual who has successfully completed it has a "good chance" of being a successful recruiter. Attention is to be given to both model development and also model validation in this evaluation of currently available data. System-effectiveness measures reflecting overall cost to the Army will be investigated. The proposed research is the first phase (Phase I) of a three-phase program to develop a decision-support system to aid in the selection of Regular Army (RA) recruiters. The goal of Phase I is to develop and validate the above model.

1.3 Very Brief Review of Literature

Testing plays a prominent role in several of the Behavioral Sciences, including Psychology and Personnel Management, in which aptitude testing is important (e.g. see Cronbach [1960], Ghiselli and Brown [1955], Wigdor and Garner [1982]). Probably the largest field of application, though, is higher education (see Crawford and Burnham [1973]) in which the Scholastic Aptitude Test (SAT) (see Weitzman [1982]) and its higher derivatives such as the Graduate Record Exam (GRE) have been given to tens of millions. In the former case (i.e. the SAT) a rather loose correlation (multiple-correlation coefficient equal to approximately 0.4 (Weitzman [1982])) has been found between math and verbal SAT scores (independent variables) and success in college (dependent variable) which is here measured by the first-year grade-point average. In Personnel Management even weaker correlations are encountered: mean correlation coefficient between screening-test result and performance on job is approximately equal to 0.2 (Wigdor and Garner [1982]). Thus, rather weak correlations have proven to be very useful in major fields of testing. Such weak correlations were again encountered in the work reported here.

Moreover, in whatever field or form (psychological) testing takes place, it is invariably being done to predict future performance (for example, to aid in the selection of candidates to fill a particular position [in the study at hand, the selection of U.S. Army recruiters]). Regression models (e.g. see Berry and Feldman [1985] and also Fox [1991]) are usually used for such predictions, and hence model validity is a particularly important issue (as it is indeed for the work at hand). In his seminal work Essentials of Psychological Testing, L.J. Cronbach [1960] points out that there are two sampling methods for validating such models (see also McKenna [1967]): (1) the current-employee method (also frequently referred to as the concurrent method (e.g. see Atwater et al. [1986])) and (2) the follow-up method (also frequently referred to as the predictive method).

Furthermore, the U.S. military (i.e. the U.S. Armed Forces) has also been a significant user of aptitude testing, with every serviceperson (and all perspective ones) being required to take the Armed Services Vocational Aptitude Battery (ASVAB) (e.g. see USAREC [1989, pp. 91-92]) (a series of ten aptitude tests[2]). The ASVAB rivals the SAT in the number of people it is given to every year[3]. Moreover, such aptitude testing for job placement was pioneered by the U.S. Armed Forces. Today, the U.S. Army has minimum-aptitude-score requirements for every military occupational specialty (MOS) (see USAREC [1989, p. 92]) except recruiting[4]. It is indeed ironic that sales aptitude (one of the main ingredients identified by USAREC Manual 100-5 as being necessary for successful recruiting) is not among those considered by the ASVAB[5].

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*To avoid distracting the reader, all footnotes have been numbered and placed together just before the references.

A widely used test (that is relevant to the work at hand) in the commercial world is the Sales Comprehension Test developed and marketed by Martin M. Bruce [1988] (see also Bruce [1978][6]). It is by far the most widely used sales-comprehension test[7] and undoubtedly the most convenient to use (e.g. see Weitzman [1994a]). Most test subjects only require 15 to 20 minutes to complete the test. Further information (including a guide to the literature of this test, discussion of test validity, and tables of norms for 40 different groups) is to be found in the "Examiner's Manual, Sales Comprehension Test, Revised" (Bruce [1978]).

The point as to whether similar work on recruiter selection had been done by the other U.S. Services was also investigated. No case of previous sales-aptitude testing was found. A review of similar work done at NPS appears in Hernandez [1994]. U.S. Navy and Marine Corps work on development of a recruiter-selection battery is reported in Borman et al. [1979] and (a different) Borman et al. [1981]. This battery of tests does not include a sales-aptitude test, but rather an interest inventory (self-appraisal) and background questionnaire. Recruiter production (the dependent variable) was measured in terms of average number of monthly recruits (i.e. contracts written) and a subjective appraisal of recruiter performance (see Borman et al. [1976]). Neither of these measures is deemed to be appropriate for the problem at hand (see Sections 1.2 and also 1.4). Favorable results for validation studies (for both concurrent (i.e. current-employee) and also predictive (i.e. follow-up) methods) were reported (Atwater et al. [1986]).

The U.S. Air Force has done no sales-aptitude testing in the past (primarily because it has not had the recruiter problems that the U.S. Army (e.g. see USAREC [1994]) has had) (Germadnik [1994]), but plans to use in the near future the same Sales Comprehension Test (i.e. Bruce [1988]) as used in the work reported here[8]. Some further references are to be found in Hernandez [1994] (see also Buchs [1994]).

1.4 Recruiter Success

For convenience and simplicity, the term "recruiter success" is used throughout this report, although the meaning of this term is not the attainment of some level of a given "success criterion," but the avoidance of a some level of a given "failure criterion": the failure to "make mission" (i.e. the failure to meet an assigned quota of recruits in a given period of time). Thus, recruiter success is used in the sense of avoiding a given failure criterion for a given period of time. In a nutshell, then, "success" actually means "avoidance of failure."

Andy Hernandez [1994, pp. 12-17] has investigated the details of "making mission" and their impact on the study at hand. He (Hernandez [1994, p. 13]) points out that it is unclear what the precise period of time to which the quota refers should be. In fact, a recruiter must make seventeen quotas each year: twelve monthly quotas, four quarterly quotas, and one yearly quota[9]. Investigating USAREC regulations and manuals and Army Regulation (AR) 601-1, Hernandez [1994, p. 13] found that USAREC practice considers monthly quotas to be the critical mission for the recruiter. Therefore, this study took recruiter "success" as referring to the meeting of monthly quotas (each and every month).

The above criterion for recruiter success corresponds to the situation that each and every USAREC recruiter has an individual quota, and that the recruiter is evaluated on whether or not this quota is met. It also leads to the two measures of recruiter effectiveness (MOREs) discussed in Section 2.5 below. With the advent of station missioning in August 1994[10], however, a new criterion for evaluating recruiter output (and also a new MORE) would have to be developed for future work.

2 Research Approach

The research approach used for the problem at hand (see Section 1.2) evolved during the conduct of the work reported here. The initial approach was to try to use existing personnel records (containing mainly biographical data) to develop a multiple-linear-regression model to predict recruiter success (see Section 1.4). The final approach was to develop a more extensive database (including results of a sales-comprehension test and also Armed-Forces-Qualification-Test (AFQT) scores, besides the usual biographical and administrative information contained in U.S. Army personnel records. The use of the Sales-Comprehension Test (Bruce [1988]) was ground-breaking for recruiting in any U.S. Military Service.

The evolution from our initial approach (which focused on existing personnel records) to our final approach (which augmented existing personnel records with various aptitude-test results) was effected by investigating two basic questions:

(1) **Will a particular candidate recruiter successfully complete Army Recruiter School?**

(2) **Will such a candidate then become a successful recruiter?**

The latter question, of course, depends on how one defines "success" (see Section 1.4 above). Investigation of these questions led us to the fields of Personnel Management (e.g. see Ghiselli and Brown [1955]) and Psychological Testing (e.g. see Cronbach [1960]).

Our research approach evolved in the following manner. The original question asked was, **"Do existing personnel records contain enough information to predict recruiter success?"** Investigation of this latter question led to a visit to the Salinas U.S. Army Recruiting Station. Informal discussions there with experienced, successful recruiting sergeants then revealed that they thought that **nothing in the Enlisted Database would be useful for predicting recruiter success.** It was stressed by these experienced, successful recruiting sergeants that sales ability was an important factor in determining whether or not a recruiter would be successful. About this time Professor Bard Mansager obtained some key literature from USAREC (e.g. USAREC [1989], [1992]) and suggested that all members of the research team read at least USAREC Manual 100-5 (USAREC [1989]).

Subsequently, Professor James G. Taylor observed that **candidate recruiters were not screened by any type of aptitude testing besides that required to qualify for their primary MOS.** It was then decided that we should focus on sales-aptitude testing. Consequently, Professor Ron Weitzman [1994a] investigated which sales-aptitude test[11] was best suited to the project at hand. The Sales-Comprehension Test of Martin M. Bruce [1988] (see also Bruce [1978]) was selected as the most appropriate test instrument, mainly because of the facts that it (1) is the most convenient to administer (Weitzman [1994a]), (2) has well-documented validity for somewhat similar (civilian) populations of sales personnel (Bruce [1978]), and (3) is difficult to "cheat" on (Weitzman [1994a]) (see also Buchs [1994, pp. 8-12]).

Because of the length of time required for model/test validation by the "follow-up"/predictive method (here a minimum of approximately 10 months), it was decided that a pilot program of administering, analyzing, and validating (according to the "current-employee"/concurrent method) the commercially-available sales-aptitude test should be pursued in the short term. Consequently, Bruce's [1988] Sales-Comprehension Test was administered by two Master's-Degree thesis students in the Operations Research (OR) Department of the Naval Postgraduate School (NPS) (Captains Buchs [1994] and Hernandez [1994]) to two USAREC recruiting battalions and a control group (attendees of a Basic NCO Course (BNCOC) at Fort Knox, Kentucky (i.e. a sample drawn from the same pool of enlisted soldiers from which recruiters are drawn)). Visitation to brigade headquarters and in-depth discussions with command personnel of the factors influencing recruiter success preceded the testing. These efforts were enthusiastically received and supported in the field.

2.1 Systems Analysis

This section briefly highlights a systems analysis of the recruiter-selection-and-training process. This analysis is discussed in more depth in Appendix A to this report. The main product of this systems analysis is a graphical depiction (together with a companion narrative description) of the recruiter-selection-and-training process (see Figures 1 [Recruiter Pre-Badge Path] and 2 [Recruiter Post-Badge Path] of Appendix A). In other words, the systems analysis produces a (nonmathematical) model of the recruiter-selection-and-training process (which is very useful for subsequently developing any mathematical model, discussing any aspect of the process, etc.). Some recent statistics concerning recruiter "failures" are also given in Appendix A (see Table A-1), with recruiter-selection criteria being given in Appendix B.

The graphical depiction allows easy visualization of the sequence and flow of events in the recruiter-selection-and-training process, particularly those points in time at which individuals leave the process (e.g. through "failure," returning to troops after a three-year tour of duty, retirement after conversion to recruiting MOS, etc.). It has been the key vehicle for developing and enhancing our understanding of this important process and has guided all our efforts in synchronizing our testing efforts with the process. It was developed from considering various USAREC and Department of the Army (DA) publications (e.g. USAREC [1989], [1992]), augmented by conversations with field personnel.

Finally, the graphical depiction of the recruiter-selection-and-training process is important for planning and implementing sales-aptitude testing according to the follow-up (or predictive) method (which is the main element of our suggested future work (see Section 4)). Accordingly, strategies for administering the Sales-Comprehension Test within the recruiter-selection-and-training process are suggested (again, see Appendix A).

2.2 Characteristics of a Successful Recruiter

"USAREC Manual 100-5 (Recruiting)" (USAREC [1989]) gives the following four characteristics as being necessary for the success of any recruiter:

(1) **salesmanship ability,**

(2) **energy and enthusiasm,**

(3) **communications skills,**

(4) **planning/organizing skills.**

Unfortunately, no USAREC publication gives any guidance for operationalizing (or measuring) the extent to which a candidate recruiter possesses any of these essential traits. Moreover, it is not even clear a *priori* that the above are the only significant variables affecting recruiter "success" (see Hernandez [1994, pp. 6-7 and 17-25] for further details).

Ideally, one would want some type of test instrument to measure the extent to which a candidate recruiter possessed each of the above traits (attributes). It would then be simply a matter of determining the correlation between possession of these traits and recruiter "success" (e.g. through use of a multiple-linear-regression model) in order to able to predict recruiter success. Unfortunately, such test instruments do not currently exist.

For convenience and because numerous USAREC personnel consistently stressed the importance of sales ability (combined with the fact that our research had revealed that candidate-recruiter sales aptitude had not been measured by USAREC previously), the research at hand focused on the measurement of sales ability with the Sales-Comprehension Test developed by Martin M. Bruce [1988] (see also Bruce [1978]). For the development of a model to predict recruiter success, other measurable variables were taken as surrogates for the other characteristics listed above (see Hernandez [1994, pp. 6-7 and 17-25] for further details).

2.3 Sales-Aptitude Test

Sales aptitude was measured by the "Sales Comprehension Test, Form M, Revised" (Bruce [1988]), which is commercially available through Martin M. Bruce of Larchmont, New York (see also Bruce [1978]). This test was chosen[12] because it is not very demanding on the time of test subjects (requiring about 15 to 20 minutes for completion), is easy to administer and score, inexpensive to purchase, and has well-documented validity, reliability, and norms for many types of salespeople. It provides an objective measure (through the scoring of thirty multiple-choice questions) of the subject's understanding of basic principles of selling (Bruce [1978, p. 2]). Although it is possible to score as high as +93 or as low as -145, Bruce [1978, pp. 9-17] uses a range of test scores from +72 to -26 for depicting norms (expressed in percentiles) of 41 different groups. The test is by far the most widely used sales-comprehension test[13] (Bruce [1994]) and has been used by many hundreds of sales organizations, with an extensive literature of test results being available (see Bruce [1978] for further information).

The Sales-Comprehension Test has been designed[14] for salespeople in civilian industry. However, Hernandez [1994, p. 4] reports that discussions with Army-Recruiting-School (ARS) instructors and recruiting-battalion leaders revealed that the test emphasizes many of the same skills that ARS teaches prospective recruiters. Moreover, Bruce [1978, pp. 3-6] reports that the test has been validated for a wide spectrum of salespeople, including insurance agents, house-to-house salesmen, securities salesmen, and copy-machine salesmen. Not all validation studies, however, reported favorable results. Most did, though. Discussing the use of the Sales-Comprehension Test, Bruce says that maximal value will be obtained when a validity study precedes operational use of the test. He also points out that it measures only one aspect (dimension) of sales ability (i.e. sales comprehension), with many other factors being important in the success of a salesperson: namely, interest, intelligence, motivation, appearance, health, verbal facility, and other variables (Bruce [1978, p. 2]). Thus, **test validation for USAREC recruiters was considered to be an essential goal.**

Accordingly, the Sales-Comprehension Test was administered to all recruiters in two recruiting battalions (Baltimore Battalion of First Brigade and Santa Anna Battalion of Sixth Brigade) and also to a control group representing the general NCO population from which recruiters are drawn (all attendees of a Basic Noncommissioned Officer's Course (BNCOC) at Fort Knox, Kentucky, in February 1994). Because of the ground-breaking nature of the use of such a test within USAREC, extensive coordination (including visitation with command personnel) preceded the actual administration of the test. The test itself was administered on site to the two recruiting battalions by two U.S. Army Captains (Todd Buchs [1994] and Andy Hernandez [1994]) attending the Naval Postgraduate School (Operations Research/Systems Analysis Curriculum). USAREC personnel administered the test (on February 14, 1994) on site to the attendees of the BNCOC at Fort Knox.

Thus, Bruce's [1988] Sales-Comprehension Test was the test instrument for measuring sales aptitude. Moreover, **the recruiter's score on the Sales-Comprehension Test** was the primary **independent variable** (also called predictive variable) for the research reported here. Further details concerning the Sales-Comprehension Test pertaining to our research are to be found in Buchs [1994] and Hernandez [1994].

2.4 Other Independent Variables

Other independent variables considered for the development of the multiple-linear-regression model to predict recruiter success were (Hernandez [1994, pp. 20-25]):

(1) **Armed-Forces-Qualification-Test (AFQT) score,**

(2) **length of time in service before becoming recruiter (in months),**

(3) **Primary-Military-Occupational-Specialty (PMOS) variable,**

(4) **candidate-selection variable,**

(5) **gender variable.**

The definitions of the first two variables are straight-forward and require no further clarification. The last three variables are binary variables, only taking on the values 0 and 1. They are defined as follows

$$\textbf{PMOS variable} = \begin{cases} \textbf{1} & \textbf{if PMOS is for a combat arm} \\ \\ \textbf{0} & \textbf{if PMOS is for a noncombat arm} \end{cases} \tag{1}$$

$$\textbf{candidate} - \textbf{selection variable} = \begin{cases} \textbf{1} & \textbf{if candidate is DA selected} \\ \\ \textbf{0} & \textbf{if candidate has volunteered} \end{cases} \tag{2}$$

$$\textbf{gender variable} = \begin{cases} \textbf{1} & \textbf{if candidate is male} \\ \\ \textbf{0} & \textbf{if candidate is female} \end{cases} \tag{3}$$

The general rationale behind the selection of these additional independent variables was that together with the Sales-Comprehension-Test score they measure the extent of possession of all the characteristics considered to be essential for a recruiter to be successful (see Section 2.2 above). The specific rationales behind the selection of the above five additional independent variables is as follows. The recruiter's Armed-Forces-Qualification-Test (AFQT) score was taken as a surrogate for both communications skills and also planning/organizing skills (see Section 2.2). The AFQT is a subset of the of the ASVAB (see Section 1.3 above), measuring intellectual capability in terms of verbal and quantitative abilities[15]. Verbal ability is the cornerstone of effective communication, which is essential for teaching, persuading, enticing, etc. potential enlistees. Additionally, intellectual ability (i.e. both verbal and quantitative abilities) is essential for coping with the complexities of planning and organizing. Moreover, Eitelberg [1988, p. 30] reports that there is a high correlation between AFQT scores and trainability (i.e. soldiers who score well on the AFQT usually achieve higher scores in service schools).

The soldier's length of service before becoming a recruiter (in months) was taken as a surrogate for planning/organizing skills, since the longer a soldier is in the service, the greater the demands for having developed such skills (Hernandez [1994, p. 19]). Finally, the last three independent variables listed above (all binary variables) were considered to measure intangibles. C. Spearman [1904] calls such intangibles "non-intellective factors" and has developed a theory of general intelligence (Spearman [1927]) that suggests many interesting ideas on how non-intellective factors (e.g. motivation, interest, energy, enthusiasm, etc.) can determine human performance.

Moreover, an initial screening of the potential significance of these last three independent variables was carried out before the development of the multiple-linear-regression model. This screening consisted of a so-called expectancy-chart analysis (e.g. see McKenna [1967, p. 61]) and was carried out using recruiter output (i.e. the dependent variable) in terms of the probability of making the monthly mission and also the overall average probability of success for all recruiters in the database of 0.6848. This analysis (done for each of the three variables classified as a non-intellective factor) supported their consideration as predictive variables. See Hernandez [1994, pp. 12-25 and Appendix G (also Appendix F)] for further details.

Thus, the independent variables discussed in these last two sections (i.e. Sections 2.3 and 2.4) provided quantitative measures of the extent to which a (candidate) recruiter possesses the four characteristics that USAREC experience has found necessary for success (see Section 2.2 above).

2.5 Measures of Recruiter Effectiveness (MOREs)

The **dependent variable** (reflecting the output of a recruiter) used in the work at hand was the **probability of making mission** (i.e. meeting the monthly quota (see Section 1.4 above)). In a nutshell, this is the probability that the recruiter is "successful" in any given month. In the field of personnel management (e.g. see McKenna [1967]) such a quantity is referred to as a "performance criterion." However, the field of operations research[16] refers to the **quantitative expression of the extent to which specific mission requirements have been attained by a system** as a **"measure of effectiveness (MOE)"** (Taylor [1973], [1992]). The essential difference between performance and effectiveness is that the latter gives consideration to system goals[17].

Accordingly, **we will refer to the dependent variable** (here the probability of a recruiter making his/her monthly quota[18]) **as estimating a Measure Of Recruiter Effectiveness (MORE)**, since it measures the extent of a recruiter's mission (i.e. goal) accomplishment. This MORE was estimated by the ratio of the total number of times that a recruiter's monthly mission was accomplished divided by the total number of months under consideration.

However, a recruiter's mission is actually composed to two major categories of enlistees: (1) Graduate or Senior Categories I-IIIA (GSA) and (2) all other categories of enlistees. The first category (GSA) consists of those individuals who have scored above the 50th percentile on the AFQT and who are either current high-school seniors (with a specified graduation date) or at least the equivalent of a high-school graduate. The second consists of all other categories of enlistees and will be referred to here as the Volume (VOL) Category (see Buchs [1994, pp. 22-23], Hernandez [1994, p. 15] for further details).

Thus, since a recruiter's mission is composed of these two categories of enlistees (namely, GSA and VOL), a composite (referred to here as "combined") probability of making mission had to be considered.

This combined probability was computed using current Department of the Army policy fractions of 0.67 and 0.33 corresponding to the GSA and VOL categories, respectively. Hence (see Buchs [1994, p. 27], Hernandez [1994, p. 15])

$$\begin{aligned}&\textbf{(combined probability of making mission)} = \\ &\textbf{(0.67)} \times \textbf{Prob [recruiter makes GSA monthly mission]} + \\ &\textbf{(0.33)} \times \textbf{Prob [recruiter makes VOL monthly mission]}\end{aligned} \tag{4}$$

Thus, the actual MORE (or **dependent variable**) used in the work at hand was the **combined probability of making mission given by equation (4)** above.

2.6 Sampling/Validation Methods

There are two methods for validating models that predict human performance (e.g. see Cronbach [1960] and McKenna [1967])

(1) **current-employee method** (also referred to as concurrent method[19]),

and

(2) **follow-up method** (also referred to as predictive method[20]).

The first method (i.e. current-employee method) tests (samples from) current employees and uses past performance data on them for model validation. It has the advantage of having minimal resource (i.e. time and effort) requirements for data collection, since existing records can be used. Unfortunately, it has the disadvantage for the work at hand of not including any unsuccessful recruiters in the database.

The second method (i.e. the follow-up method) tests (samples from) selectees and then, while they are at school or at work, starts to collect performance data for model validation. Thus, the "follow-up" method uses future performance data, and one must wait for this data to be collected. If one were to use this method and tested candidate recruiters just before entry into the Army Recruiting Course (ARC), then one would have to wait for at least 11 months to find out which candidate recruiters failed either the ARC or during the nine-month TTE period (see Appendix A). See Buchs [1994, pp. 12-14] for a more detailed discussion of the pros and cons of each of these two methods.

Additionally, judgment sampling[21] was used to select the two battalions and also the control group to which the Sales-Aptitude Test was administered. Specifically, data was collected from two recruiting battalions[22] (i.e. the Sales-Comprehension Test was administered to all recruiters in them), which were judgmentally selected from among USAREC's approximately (at that time) 40 recruiting battalions. These two battalions were selected to represent an "outstanding" and also an "average" recruiting battalion. Thus, these two battalions were a **judgment sample**[23] from USAREC's recruiting battalions. Additionally, data was also collected from a control group[24] representing the general population of sergeants from which recruiters are drawn (i.e. the E5/E6 pool of Appendix A). This control group was also a judgment sample.

Circumstances (i.e. lack of sufficient time) dictated that the current-employee method be used for the study at hand. Consequently, no data was collected for unsuccessful recruiters, and this situation may have diminished results. However, our work here does show the great potential of personnel testing for helping to solve USAREC problems. **It is most strongly recommended that the follow-up method be used whenever possible in future work.**

2.7 Data Collection and Database Development

Field data collection consisted of administering Bruce's [1988] Sales-Comprehension Test to the two selected recruiting battalions by U.S. Army Captains Buchs and Hernandez and also to the BNCOC attendees by USAREC personnel. More specifically, the Sales-Comprehension Test was given to 131 recruiters in the Baltimore Battalion of the First Recruiting Brigade and to 145 recruiters in the Santa Ana Battalion of the Sixth Recruiting Brigade. Additionally, it was given to 54 sergeants in the BNCOC at Fort Knox, Kentucky, of which 31 did not have any prior sales experience and 23 did (including 6 former recruiters). Around this basic sales-aptitude data were constructed two databases: Buchs's [1994] database and Hernandez's [1994] database.

The data in Buchs's database consisted of Sales-Comprehension-Test scores (see Buchs [1994, Appendix C]), data from a "respondent data form" given to each person who took the Sales-Comprehension Test (see Buchs [1994, Appendix D]) and administrative and personnel data provided by the battalion tested and also the Program-Analysis-and-Evaluation (PA&E) Directorate of Headquarters USAREC. There were two major subdivisions in Buchs's database: one part for data on recruiters and the other for nonrecruiters (i.e. attendees of the BNCOC). The recruiter database contained data on 14 variables for each recruiter (see Buchs [1994, pp. 17-19] for further details. It should be noted that Buchs's MORE 2 is the Measure of Recruiter Effectiveness (MORE) given by equation (4) in Section 2.5 above (i.e. the "combined" probability of making the monthly mission). The nonrecruiter database contained data on three variables (see Buchs [1994, p. 20]).

Hernandez's database contained all Buchs's recruiter data plus additional administrative data from the tested battalions and also ASVAB and AFQT scores obtained from the Defense Manpower Data Center (DMDC) and also the Army Research Institute (ARI). Hernandez's thesis contains his "initial database for 276 recruiters" (Hernandez [1994, Appendix A]) (which essentially amounts to Buchs's database for recruiters), as well as his "reduced database for 101 recruiters" (Hernandez [1994, Appendix D]) (which consisted of data on the six independent variables discussed in Sections 2.3 and 2.4 above and also the corresponding MORE for the 101 recruiters for whom complete TTE-period[25] records were available).

3 Results of Data Analysis

Data-analysis results are highlighted in this section, with complete details (including samples of and sometimes large parts of the databases involved[26]) being available in the two student theses cited in Section 1 above: Buchs [1994] and Hernandez [1994]. The first of these theses (namely, Buchs [1994]) investigated whether the Sales-Comprehension Test (SCT) by itself could predict recruiter success. The current-employee/concurrent sampling method was used for both these theses. Thus, only (currently) successful recruiters were available for testing[27]. Buchs's thesis also contains a preliminary statistical screening of the Sales-Comprehension-Test-score data, which provides some valuable insights into the general nature of sales comprehension and ability (and their measurement) and the possession of these essential capabilities by USAREC personnel.

The second thesis (Hernandez [1994]) investigated whether a multiple-linear-regression model could be developed for a database that included results of the Sales-Comprehension Test and also Armed-Forces-Qualification-Test (AFQT) scores, besides the usual biographical and administrative information contained in U.S. Army personnel records (see Section 2.7 above). The same sales-comprehension-test scores as used by Buchs were used by Hernandez.

More precisely, Hernandez used a subset of Buchs's SCT-score data (that was considered to be most germane to investigating the validity of his multiple-linear-regression model), augmented by some additional (readily-obtainable) personnel data on the recruiters tested. One important contribution of Hernandez's work was the creation of a basic database (including both SCT and also AFQT scores) relating recruiter characteristics and capabilities to performance. No such database had heretofore existed. Because of the data limitations noted above (i.e. use of the current-employee method of testing), complete statistical details will not be given here (even for the highlighted results), since data quality may not warrant it.

3.1 Recruiter Sales Comprehension and General Test Validity

Knowledge of recruiter sales comprehension and ability is critical for developing and using any model to predict recruiter success. Do some recruiting battalions just have (or attract) recruiters with greater recruiting abilities? Moreover, are Sales-Comprehension-Test (SCT) scores stable over time (suggesting that sales comprehension (like intelligence) is innate to a recruiter)? Or, can they change (suggesting that sales comprehension can be acquired/learned)? Can the Sales-Comprehension Test (SCT) distinguish between people with sales experience and those without it? Such important questions were investigated by a general analysis of the test data[28].

Basic descriptive statistics (essentially means and standard deviations) were computed for the SCT data collected from each of the two recruiting battalions tested (and also for the output, or dependent, variable discussed in Section 2.5 above) (Buchs [1994, p. 56]). Results are shown in Table I below. For our study reported here, the combined probability of making mission was taken as the basic measure of recruiter effectiveness[29] (MORE) and (for a given recruiter) is given by equation (4) above.

TABLE I: Means and Standard Deviations for the Two Battalions that were given Sales-Comprehension Test

Battalion	Test Score		Combined Probabilty of Making Mission	
	Mean	Standard Deviation	Mean	Standard Deviation
Baltimore (n = 131)	21.27	19.91	0.738	0.136
Santa Ana (n = 145)	20.10	18.00	0.681	0.142

Statistical analysis (Buchs [1994, pp. 36-37 (see also p. 94)]) (using[30] $\alpha = 0.05$) revealed that there is no statistically-significant difference in the means and standard deviations for test scores of the two battalions (i.e. all test-score data is essentially drawn from similar sources (i.e. population)).

Consequently, test data for the two battalions was combined for subsequent analyses (by both Buchs [1994] and also Hernandez [1994]), especially when sample sizes in some cases became perilously small. Thus, on the basis of statistical analysis of test data for two USAREC battalions, we have tentatively concluded that **sales comprehension of recruiters is possibly the same in all USAREC recruiting battalions**. For many USAREC purposes, such a result can be extremely valuable.

Do non-recruiters have the same level of sales comprehension as recruiters do? One would expect that (by the very nature of the different mental and emotional environments of the soldiers in question) they do not have the same level of sales comprehension and consequently will score (statistically) differently on the Sales-Comprehension Test. Moreover, Bruce [1978, pp. 3-4] has reported that his Sales-Comprehension Test will distinguish between sales and non-sales personnel (which is taken as an indication of the test's status validity (American Psychological Association [1966])).

Hence, the Sales-Comprehension Test was also administered to a control group representing the general NCO population from which recruiters are drawn (all attendees of a Basic Noncommissioned Officer's Course (BNCOC) at Fort Knox, Kentucky, in February 1994, and all these attendees currently in non-sales jobs/MOSs). Some BNCOC attendees, though, did have prior sales experience or had even been recruiters (see Buchs [1994, especially pp. 84 and 87] for further details). Some basic descriptive results (from Buchs [1994, p. 58]) are shown in Table II below. Statistical analysis[31] has revealed that the difference between the mean test scores of recruiters and non-recruiters is highly statistically significant. It is also test-scorewise quite substantial.

Table II. Some Basic Descriptive Statistics for Sales-Comprehension-Test Scores of Recruiters and Non-Recruiters

Sample Group	Test Score			
	Mean	Standard Deviation	Maximum Value	Minimum Value
Non-Recruiters (n = 54)	-3.15	26.41	47	-90
Recruiters (n = 276)	20.66	18.93	64	-38

Thus, one can safely conclude (at least tentatively) that recruiters and non-recruiters score substantially differently on Bruce's [1988] Sales-Comprehension Test. As noted above, this fact can then be taken as an indication of the test's status validity (American Psychological Association [1966]). Hence, (in some sense) **the general validity of the Sales-Comprehension Test has been established**. It remains, though, to investigate whether or not the test (by itself or in combination with other indicators) has enough predictive capability for USAREC purposes (i.e. whether the test can be used to help predict recruiter success).

First, however, it will be instructive to consider the various categories of recruiters (and also non-recruiters) considered by Buchs. In his investigation of whether the Sales-Comprehension Test by itself could predict recruiter success, Buchs [1994, p. 29] found it natural (and most appropriate) to group his data on recruiters according to whether a recruiter was currently in

(1) the TTE period,

(2) his/her first recruiting tour of duty (but after the TTE period), or

(3) a recruiting tour of duty beyond the first (and is a career recruiter).

Because of the computational requirements for one of the Measures Of Recruiter Effectiveness (MOREs) (combined cumulative percent success (see Buchs [1994, pp. 24-261])) used in his work, this classification of recruiters (and hence the test data) seemed natural to Buchs. Expressed another way, recruiters could equivalently be classified as

(1) recruiters with 0 months to 9 months recruiting experience,

(2) recruiters with 10 months to 24 months recruiting experience, or

(3) recruiters with greater than 24 months recruiting experience.

For brevity, these recruiter categories were usually referred to as

(1) recruiters (0-9 months),

(2) recruiters (10-24 months), and

(3) recruiters (> 24 months).

Data was also available (e.g. see Buchs [1994, p. 20]) to consider various categories of non-recruiters (i.e. BNCOC attendees who were tested). Moreover, it is instructive to consider (based on the above classification considerations) test-score descriptive results for these various categories of recruiters and non-recruiters. Some basic descriptive results are consequently shown in Table III below.

Table III. Some Basic Descriptive Statistics for Sales-Comprehension-Test Scores for Various Categories of Recruiters and Non-Recruiters

Sample Group	Test Score			
	Mean	Standard Deviation	Maximum Value	Minimum Value
Non-Recruiters (All)	-3.15	26.41	47	-90
Non-Recruiters with no Sales Experience	-12.39	26.73	27	-90
Non-Recruiters with Sales Experience	9.30	20.77	47	-24
Non-Recruiters with Sales Experience (Less Past Recruiters)	12.56	19.57	47	-16
Recruiters (0-9 months)	20.59	22.54	63	-32
Recruiters (10-24 months)	20.48	18.75	64	-38
Recruiters (> 24 months)	20.82	18.35	63	-26

Focusing on the above three categories of recruiters, the same basic descriptive results are shown in Table IV below, with less clutter from non-recruiter results. Statistical analysis

Table IV. Some Basic Descriptive Statistics for Sales-Comprehension-Test Scores for the Three Categories of Recruiters

Sample Group	Test Score			
	Mean	Standard Deviation	Maximum Value	Minimum Value
Recruiters (0-9 months) (n = 28)	20.59	22.54	63	-32
Recruiters (10-24 months) (n = 116)	20.48	18.75	64	-38
Recruiters (> 24 months) (n = 132)	20.82	18.35	63	-26

(Buchs [1994, pp.51-52]) revealed that these three length-of-recruiting-experience-based categories of recruiters have basically the same mean test scores (and also standard deviations). Thus, as far as test scores are concerned, recruiters (even with quite different amounts of recruiting experience) are essentially a very homogeneous group. This result also suggests (but there is no temporal data to confirm the hypothesis) that a recruiter's test score is constant over time. One would have to do some type of follow-up[32] testing to firmly establish such a fact (i.e. the constancy of a recruiter's Sales-Comprehension-Test score over time).

Such insights (i.e. how test scores depend (or do not depend) on amount of recruiting experience) can be extremely valuable for model (to predict recruiter success) development and validation (as well as for managing recruiters in general). We have barely scratched the surface here and much more important work remains to be done.

3.2 Prediction of Recruiter Success by Test Score Alone

Initially we had thought that recruiter success would be highly correlated with Sales-Comprehension-Test score (henceforth simply denoted as "test score" when no ambiguity exists). Thus, our initial working hypothesis was that there would be a positive correlation between test score and recruiter performance as measured by our Measure Of Recruiter Effectiveness (MORE) given by equation (4). Later we found that Martin Bruce [1978, p. 2] (creator of by far the most widely-used sales-comprehension test (and consequently an authority on predicting the success of sales personnel)) had specifically emphasized that many other factors besides sales comprehension are important for success as a sales-person: interest, intelligence, motivation, appearance, health, verbal facility, etc. The thesis results of Buchs [1994] and Hernandez [1994] have corroborated Bruce's statement.

After collecting data (both test scores and also performance data (in the latter case, values for our MORE), **scatter plots** (see Buchs [1994, pp. 117, 123, and 129]) **of test score versus MORE-value** (i.e. **the composite probability that a particular individual makes mission** (as given by equation (4))) were constructed. These scatter plots, however, displayed little trend (i.e. relationship) between the values of these two variables.

Moreover, an investigation of correlation coefficients (see Table V below) statistically confirmed the obvious (as shown in the scatter plots discussed above): a recruiter's test score had little correlation with his/her performance as measured by our MORE.

The P-values quoted in Table V above correspond to the hypothesis test (two-tailed) that the population correlation coefficient is equal to zero (see Buchs [1994, pp. 31-32] for further details). Spearman's rank correlation coefficient was used to estimate this population parameter if the data suggested departure from normality in the underlying population (statistical testing involved here too). Otherwise, Pearson's correlation coefficient (for normal populations) was used (again, see Buchs [1994, pp. 32-34] for further details). The P-value results given in Table V indicate that one cannot reject the hypothesis (at a significance level, $\alpha = 0.05$) that there is no (i.e. zero) correlation between a recruiter's test score and performance measured by our MORE.

Table V. Correlation between Sales-Comprehension-Test Score and Combined Probability of Making Mission (MORE Given by Equation(4))

Sample Group	Pearson's Correlation Coefficient	2-Tailed P-Value for P's C. C.	Spearmans's Correlation Coefficient	2-Tailed P-Value for S's C. C.
Recruiters (0-9 months) (n = 103)	—	—	0.11	0.26
Recruiters (10-24 months) (n = 113)	-0.01	0.91	—	—
Recruiters (> 24 months) (n = 131)	-0.06	0.47	—	—

One point concerning the sample size for the sample group "Recruiters (0-9 months)" (i.e. recruiters currently in the TTE period) merits further discussion here. Although only 28 out of the 276 recruiters tested were actually currently in their TTE period, USAREC records did provide TTE-period performance data (and hence a value for the MORE could be estimated) for many field recruiters (i.e. recruiters who had already completed their TTE period). Since the data suggested that a recruiter's Sales-Comprehension-Test score is constant over time (see discussion in Section 3.1 above, just after Table IV), past TTE-period performance data was consequently combined with test scores for those recruiters for whom the appropriate TTE-period records existed (see Buchs [1994, p. 39] for further discussion). These considerations led to a larger sample size for the recruiter category "Recruiters (0-9 months" than the number of recruiters (who were currently in their TTE period) actually tested.

Finally, Buchs [1994, pp. 54-55] showed that the Sales-Comprehension Test could not distinguish between successful and unsuccessful recruiters (success/nonsuccess measured in terms of our measure of recruiter effectiveness (MORE)), which is consistent with (and implied by) the fact established immediately above that a recruiter's test score was essentially not correlated with his/her performance. Buchs demonstrated this by comparing the mean test score for the top 30 with that of the bottom 30 recruiters (determined by past recruiting performance) for each of the three categories of recruiters with different amounts of recruiting experience (see Table VI below). None of the observed differences between mean test-score values for a particular category of recruiter (e.g. "Recruiters (10-24 months)" = "recruiters with between 10 and 24 months of recruiting experience") of the top 30 recruiters and of the bottom 30 was statistically significant at $\alpha = 0.05$ (see Buchs [1994, pp. 150, 155, and 160 of Appendix H] for information on the hypothesis tests conducted, with supporting information on satisfaction of test assumptions also being provided).

Thus, none of the observed differences in test-score means for a given category of recruiter shown in Table VI turned out to be statistically significant. The fact that relatively less successful recruiters had higher test scores (i.e. the mean test-score value for the bottom 30 was higher than that for the top 30 recruiters) in the last two categories of recruiters corresponds to the negative values for (sample) correlation coefficients shown in Table V above.

Table VI. Sales-Comprehension-Test-Score Means and Standard Deviations for Top 30 and Bottom 30 Recruiters for Each of the Three Basic Categories of Recruiters

Sample Group	Mean	Standard Deviation
Top 30 Recruiters (0-9 months) (n = 30)	21.52	17.47
Bottom 30 Recruiters (0-9 months) (n = 29)	20.00	14.91
Top 30 Recruiters (10-24 months) (n = 30)	18.62	19.82
Bottom 30 Recruiters (10-24 months) (n = 30)	19.57	14.43
Top 30 Recruiters (> 24 months) (n = 31)	17.77	18.08
Bottom 30 Recruiters (> 24 months) (n = 31)	22.71	16.06

3.3 Multiple-Linear-Regression Model

Because Buchs [1994] had shown that the Sales-Comprehension-Test (SCT) score of a recruiter was by itself inadequate to predict success, a multiple-linear-regression model was developed by Hernandez [1994]. This approach considers data as observations on a dependent variable, here denoted as (DV), corresponding to given values of n independent variables. It assumes a linear (regression) model for the data (here the subscript i denotes the ith observation and ε denotes an error term with certain assumed statistical properties) and develops an estimation equation for the mean value of the dependent variable (here the measure of recruiter effectiveness (MORE)) where $j \epsilon J_S$ means that only the significant

$$(DV)_i = \beta_0 + \sum_{j=1}^{n} \beta_j (IV)_{ij} + \varepsilon_i \tag{5}$$

$$(\overset{\wedge}{DV}) = b_0 + \sum_{j \epsilon J_s} b_j (IV)_j \tag{6}$$

independent variables are retained in the (final) model, and the subscripted "bs" are point estimates (least-squares estimators) of the correspondingly subscripted "βs" (which are population parameters).

Using this approach, Hernandez [1994, p. 64] developed a multiple-linear-regression model with the following **estimation equation for recruiter success in terms of the combined probability** (see equation (4)) **that the recruiter makes mission in any given month of the TTE period**

$$\text{Estimated Mean Success Probability} = \\ 0.54 + 0.00064\,(\text{AFQT}) + 0.00086\,(\text{SCT}) + 0.11\,(\text{Gender}) - 0.037\,(\text{PMOS}) \tag{7}$$

where (AFQT) denotes the recruiter's Armed-Forces-Qualification-Test (AFQT) score, (SCT) denotes his/her SCT score, (Gender) denotes the gender variable defined by equation (3), and (PMOS) denotes the Primary-Military-Occupational-Specialty (PMOS) variable defined by equation (1) above. For simplicity, we will refer to "Estimated Mean Success Probability" henceforth as "Estimated Success Probability".

Equation (7) is the main product of the work reported here. It is a first cut at the sought-after model to predict recruiter success, and has been (partially) scientifically validated. Model shortcomings, however, are noted below, and suggestions made (see, especially, Section 4) for remedying them. Such future refinements would take the work at hand for their point of departure.

This model (7) identifies four recruiter attributes (two represented by test scores and two classification categories) that can predict the combined probability of making mission in any given month of the TTE period. Scores on the AFQT and SCT, respectively, measure a soldier's communications/organizing and potential sales skills. The gender and PMOS variables are categorical variables differentiating groups with perhaps greater or less potential for success in recruiting.

The numerical sign of each coefficient in the model (7) shows whether the variable in question is positively or negatively correlated with recruiting success (as defined above). Thus, the positive sign for the AFQT and SCT scores means that soldiers with higher scores on each of these tests tend to have greater success as a recruiter. On the average, male recruiters are more successful than female recruiters (although this might be a statistical quirk of having only a small sample size for female recruiters[33]). A surprising[34] result was that having a combat-arm PMOS had a negative effect on a recruiter's performance.

Based on their research, **the authors recommend that the model (7) be used exclusively**, not inclusively (i.e. be used to identify candidate recruiters either to be eliminated from recruiting or to be identified as a potential high risk to be able to remain in recruiting on the basis of recruiting performance, rather than be used blindly to "qualify" sergeants for recruiting). We are skeptical that a high score (i.e. high value for estimated success probability from (7)) would (or even could) guarantee candidate recruiter success, but we believe that a relatively low predicted/estimated success probability would portend potential trouble ahead for the individual. Furthermore, our work here indicates that **the model (7) possesses comparable predictive capability** (value for its coefficient of multiple correlation[35]) **as that of the SAT in predicting a student's first-year-college performance** (i.e. degree of success). The model's validity is further discussed in Section 3.3.2 below.

Finally, the **major shortcoming of the model (7) is that it was developed from "current-employee"** (as opposed to "follow-up") **data** (see Section 2.6 above). No data at all was available on unsuccessful recruiters. **It is most strongly recommended that**

future work generate "follow-up" data (see Section 2.6 above; also Hernandez [1994, p. 69]) **to remedy this situation.**

3.3.1 Development of Model

There are **two aspects of the model's development** that need discussion: **conceptual** and **statistical.** Conceptually, one needs some working hypothesis as to what might be the significant (in a physical sense) independent variables upon which the dependent variable (here the MORE) depends. Knowledge of the prediction of human performance by psychologists and the recruiting system led us to consider the following six variables as candidate independent variables:

(1) Sales-Comprehension-Test (SCT) score,

(2) Armed-Forces-Qualification-Test (AFQT) score,

(3) the length of time in the Army before becoming a recruiter (in months),

(4) the Primary-Military-Occupational-Specialty (PMOS) variable defined by equation (1),

(5) the candidate-selection variable defined by equation (2), and

(6) the gender variable defined by equation (3).

The above independent variables represent an initial starting point (as far as independent variables are concerned) in a trial-and-error procedure of investigating which variables to include in the final model.

A multiple-linear-regression model was then developed for these six independent variables (with the MORE defined by (4) being the dependent variable), and variables eliminated on the basis of statistical analysis that investigated each variable's contribution to fitting the data. Statistical aspects have to do with this analysis. The reason for differentiating between the conceptual and statistical basis for model development is to point out here that other conceptual bases are possible (i.e. other initial independent variables hypothesized to yield the observed values for the MORE (dependent variable)).

Starting with the above initial six independent variables, Mallow's coefficient (denoted as C_p) was used to select the best subset of variables from them for minimizing the error mean square (denoted as MSE) of the estimated mean value of the dependent variable (e.g. see Hernandez [1994, pp. 34-37], Fox [1991, pp. 18-19], Neter, Wasserman, and Whitmore [1993, Chapters 18-20]). Mallow's method involves computing (for each (proper) subset of the original independent variables) the coefficient C_p given by

$$C_p = (m + 1 - p)\,(F_{m-p} - 1) + p \tag{8}$$

where m denotes the total number of independent variables being considered for the model (here equal to six), p denotes one plus the total number of independent variables in the subset being evaluated, and F_{m-p} denotes the test statistic for testing the null hypothesis that the "β"s corresponding to the **excluded** variables are all equal to zero.

When F_{m-p} is small, the MSE of the excluded variables is large (e.g. see Hernandez [1994, p. 34]). When $C_p > p$, the corresponding subset of independent variables is not a good subset selection because it has excluded a variable set with a large F-statistic-value, meaning a small MSE for the excluded variables (see Hernandez [1994, p. 34] for further details). Hence, one considers subsets (of the initial independent variables) for which $C_p < p$ as candidates for selection as the best variable subset.

For his data set (see Hernandez [1994, Appendix D (p. 97)]), Hernandez calculated values of C_p for all 62 proper subsets of the above six independent variables and found only three values less than the corresponding value of p (see Table VII below).

Table VII. Candidate Variable Subsets for Selection as Best Variable Subset according to Mallow's Method

Subset Group	Variables Included in Model	Value for p	Mallow's Coefficient C_p	Coefficient of Multiple Correlation R	Coefficient of Multiple Determination R^2
44	ATGP	5	4.41	0.3082	0.0950
56	ATGS	5	4.71	0.2866	0.0822
60	ATGPS	6	5.05	0.3317	0.1100

Table VII follows Hernandez's notation, with the letter "A" in the second column denoting the variable "AFQT score", "T" denoting the "SCT score", "G" denoting the "gender variable", "P" denoting the "PMOS variable", and "S" denoting the "candidate-selection variable". The coefficient of multiple determination, denoted as R^2, is given (as usual) by the regression sum of squares divided by the total sum of squares for the multiple-linear-regression model correspond- ing to the subset number under consideration.

The model based on subset number 60, which excludes the length of time (in months) in the Army before becoming a recruiter from the set of predictive variables (and hence consists of the remaining five independent variables), gives the best fit to the data, since it has the largest value for the coefficient of multiple determination. This model has the following estimation equation:

$$\text{Estimated Success Probability} = 0.54 + 0.00064\,(\text{AFQT}) + 0.00086\,(\text{SCT}) + 0.11\,(\text{Gender}) - 0.037\,(\text{PMOS}) + 0.049\,(\text{Selection}) \tag{9}$$

where (Selection) denotes the candidate-selection variable given by equation (2) above.

For the model corresponding to this estimation equation, Hernandez [1994, pp. 39-40] tested the hypothesis^{36} that all the corresponding "β"s were equal to zero and found a p-value of 0.0467 for the F-statistic as used previously. Hence, the estimation equation (9) is reasonable for the data at hand. Further hypothesis testing investigated the significance of the coefficients in (9) and indicated that the candidate-selection variable had a zero beta-value (i.e. $\beta_S = 0$) in the regression model corresponding to the estimation equation(9). Hence, the term involving (Selection) was dropped from (9), whence follows the final estimation equation (7).

3.3.2 Model Validity

What faith should USAREC have that the model developed to predict recruiter success (7) will actually be useful in the future for managing recruiters' careers by estimating this probability? There are two aspects to be considered

(1) **mathematical appropriateness** of the model for describing the data,

(2) **scientific validity** that a theoretical value for mean combined probability of recruiter success will actually agree with (in some sense) a corresponding observed value.

Mathematical appropriateness of the multiple-linear-regression model was investigated by means of residual analysis. Independence of errors (i.e. the "ϵ_i"s), their normality, and linearity of the model were investigated and proved to be satisfactory (Hernandez [1994, pp. 45-50]). Thus, residual analysis has validated the satisfaction of the assumptions underlying the use of a multiple-linear-regression model. Hence, it can be said that the final model (7) is an appropriate one for estimating how recruiter success probability depends on measurable recruiter attributes.

Scientific validation of the final model (7) was much more difficult, since it was impossible to generate new observed values of the combined probability of recruiter success against which to test (theoretical) estimated values from (7). Consequently data splitting had to be resorted to. The entire data set of 101 observations was split into two separate components: a model-building subset and a validation subset. Following well-recognized procedures, Hernandez [1994, pp. 50-51] generated a model-building subset of 71 observations and a validation subset of 30 observations. Model validation was then investigated by computing the mean-squared predictive residual for the validation subset and comparing this value with that of the mean squared error of the regression model developed with the model-building data subset. Again, Hernandez [1994, pp. 51-54] reported satisfactory results and (hence) one can conclude that theoretical and observed values do coincide for the regression model developed. However, it must always be born in mind that "current-employee" data (not including any data for failed recruiters) was used.

3.3.3 Cost-Benefit Analysis of Proposed Recruiter-Selection Procedure

It is of considerable interest to investigate the possible savings that might accrue to USAREC from using a model like (7) to predict recruiter success probability. Hence, this section sketches an approach for cost-benefit analysis of this model.

In general, a cost-benefit analysis of a selection procedure requires a number of items of information:

(1) **the results of a regression analysis:** in particular the multiple (or simple) **correlation coefficient (R)** [in this case, R = 0.31],

(2) **the selection ratio (SR)**, which is the ratio of the number of people selected (1560 annually) to the number available for selection (for the calculation at hand taken to be 6700 annually (a fictitious figure used for illustrative purposes, much smaller than the actual one) [in this case, SR = 0.23],

(3) **the base rate (BR)**, which is the proportion of current workers who are successful (not dropouts for ineffectiveness) [in this case during the TTE period, BR = 0.755],

(4) **the cost of a selectee**, including travel and schooling [in this case, $12,287.51].

The analysis makes use of the Taylor-Russell tables (Taylor and Russell [1939]; see also Hernandez [1994, pp. 72-74]), which use R, SR, and BR to yield an estimate of the proportion of selectees expected to be successful as a result of the use of the selection procedure associated with the value R (**the expected success rate (ESR)**) [in this case, ESR = 0.90].

Two steps remain; the first is to convert BR and ESR to their complements: failure rates [in this case, 0.245 and 0.10, respectively]. The final step is to multiply each of these failure rates by the product of 1560 and $12,287.51 to obtain the (total) cost of failures occurring without and with the use of the selection procedure [in this case,

$$\text{(COST WITHOUT)} = 0.245\ x\ 1560\ x\ \$12{,}287.51 = \$4{,}696{,}286.30$$

$$\text{(COST WITH)} = 0.100\ x\ 1560\ x\ \$12{,}287.51 = \$1{,}916{,}851.50$$

The difference between these two dollar amounts is the annual savings (exclusive of the cost of testing the candidates) [in this case, annual savings = $2,779,434.80]. This is a conservative figure because SR is likely to be much smaller than 0.23 and also because the study at hand used the current-employee method rather than the follow-up method to determine R.

Other cost-benefit analyses appear in Buchs [1994, pp. 59-65] and Hernandez [1994, pp. 57-61]. All such analyses suggest quite substantial potential savings for USAREC from use of a model like (7). We have barely scratched the surface here, and much more important work remains to be done.

4 Suggested Future Work

Prospects for the future are extremely bright provided that efforts are channeled in those directions that are most useful for USAREC. For example, results of our initial work reported here (see Section 3 above) indicate that **the only way to validate the "Sales-Comprehension" Test** (Bruce [1988]) **is to use the follow-up (or predictive) method of testing: i.e. to test candidate recruiters before they enter into the recruiting program and then to monitor their subsequent progress** in Recruiter School, during the TTE period, and then during their normal recruiting tour of duty. **This is also then essentially the only way to develop a valid recruiter-selection model.** Moreover, follow-up testing[37] should be pursued and related to the recruiter's progress. Finally, if USAREC adopts station missioning, then the methodology developed here should be adapted to this case.

Thus, future work should focus on the following three themes:

(1) **pilot program** (within USAREC) **of testing (primarily using the "Sales-Comprehension" Test, but also considering interests and communications and organizing skills)** of recruiters before they enter Recruiter School and during their subsequent management;

(2) **adaptation of the methodology developed here to station missioning** (including the above pilot program);

(3) **stress management (primarily based on stress-related inputs** (especially stress tolerance)**from the Minnesota Multi-phasic Personality Inventory (2nd version)(MMPI-2)).**

These three approaches in some sense are interrelated, since the choice of the **Measure of Recruiter Effectiveness (MORE)** (e.g. station missioning) can be changed to reduce the stress level for an individual recruiter without (hopefully) compromising the achievement of overall USAREC goals. Additionally, selecting recruiters with greater sales aptitude should also reduce the stress level for recruiters.

Additional topics to be considered under the three above themes (or otherwise) are the following:

(1) **stress-tolerance measurement and stress management,**

(2) **development of measures of recruiter effectiveness for station missioning** (i.e. the yardstick for evaluating recruiter performance will have to

be changed for station missioning).

(3) **revising the Sales-Comprehension Test to be more sensitive to USAREC requirements,**

(4) **measurement of other attributes of candidate recruiters** (e.g. interest in sales, communication ability, organizational ability),

(5) **diagnostics for remedial training of recruiters**, and

(6) **data entry and data management within USAREC.**

5 Final Comments

Our initial results concerning the development of a multiple-linear-regression model to predict candidate-recruiter success in Recruiter School and during subsequent duties have been very encouraging. Literature research revealed that aptitude testing had produced minimum-qualifying scores for entry into every U.S. Army MOS except Recruiting. Consequently, a current-employee/concurrent testing program with a Sales-Comprehension Test was under-taken. This was the first use of such a sales-aptitude test to assist in the selection of recruiters by any U.S. Service. Currently, the USAF Recruiting Service (which was presented the results of our research at a Joint Recruiting Conference) is planning to use the Sales-Comprehension Test to improve its process of selecting and training recruiters.

Lack of sufficient time, however, precluded pursuing a "follow-up"/prediction testing program, and hence only successful recruiters were available for testing. Nevertheless, prospects for developing such a model appear to be very favorable.

FOOTNOTES

1. The discussion of "Problem Statement" in the main text follows that of the original proposal to USAREC for the work reported here, except that the discussion has been somewhat condensed.

2. The exact number of aptitude tests (e.g. see Weitzman [1985]) has changed (and undoubted will continue to change over time) (Weitzman [1994b]).

3. As estimated by Weitzman [1994b].

4. Technically speaking, the recruiting MOS refers to those Regular Army (RA) recruiters who are "permanent" recruiters (i.e. they will remain recruiters until they retire from the U.S. Army). A recruiter can only achieve this status as a result of superior performance in (among other things) meeting recruiting quotas (see Section 1.4 above). Hence, it is probably unheard of for such a recruiter not to make mission. Moreover, "temporary" recruiting sergeants (i.e. those who are not "permanent" recruiters) are assigned for a three-year tour-of-duty as a recruiter. It is those "temporary" recruiters who fail to meet their quotas (see Section 1.4 above) that are of concern to USAREC.

5. The fact that sales aptitude is considered to be a necessary ingredient for successful recruiting by USAREC Manual 100-5 [1989] and no sales-aptitude test is included in the ASVAB (or given as a later screening test) is one of the major initial findings of the work at hand. Informal discussions with recruiting sergeants at the Salinas U.S. Army Recruiting Station substantiated the importance of sales aptitude.

6. Martin M. Bruce's Sales Comprehension Test goes back at least to the early 1950s and has evolved through several different versions. The current version (Bruce [1988]) was developed (with essentially no impact on the content of the examiner's manual) after the first publication of the examiner's manual (Bruce [1978]). Supplements to this edition of the examiner's manual have subsequently appeared (Bruce [1994]) (updating, for example, validity studies). Thus, the examiner's manual actually bears an earlier publication date than the Sales Comprehension Test (Bruce [1988]).

7. Bruce [1994] has kindly pointed out that his Sales Comprehension Test is by far the most widely used. Over one million tests have been administered. The test has been translated into many languages, including French, Polish, Danish, German, and Spanish. It literally has been given throughout the civilized world (Bruce [1994]). Moreover, he says that such research on sales-comprehension testing goes back to 1928. Prior to using sales-comprehension tests in the process of selecting salesmen, insurance companies used essentially biographic data. This method was producing less-than-satisfactory results. Consequently, the first sales-comprehension test was developed by a staff of psychologists of an insurance company in order to more effectively select salesmen (Bruce [1994]).

8. George Germadnik [1994], Chief of the Market Research Section (Headquarters USAF Recruiting Services), has generously supplied (informally) the authors with much valuable background information concerning USAF recruiting operations. For example, 100% of USAF recruiters are volunteers, and it does have a "recruit-the-recruiter" program. The occurrence of "relief action" for a recruiter has not been so acute as for the U.S. Army, although "spikes" in such occurrences do occasionally occur. Moreover, CPT Andy Hernandez was invited to make a presentation of his/our results to a Joint Recruiting Conference hosted by USAREC in June 1994, and George Germadnik attended this conference. He has kindly provided the authors with useful information several times since then.

9. These seventeen time periods are known throughout the recruiting community as the "seventeen races." Further background information on them are given in Hernandez [1994, p. 13].

10. This point was revealed during research discussions with USAREC representatives on Wednesday, August 31, 1994.

11. There were four commercially-available tests considered (Weitzman [1994a]) for this pilot study:

    (1) "Sales-Aptitude Test: ETSA Test 7A," Employer's Test and Services Associates, Inc.,

    (2) "Sales Aptitude Check List," Science Research Associates, Inc.,

    (3) "Sales Motivation Inventory, Revised," Martin M. Bruce, Ph.D., Publishers,

    (4) "Sales-Comprehension Test, Form M, Revised," Martin M. Bruce, Ph.D., Publishers.

12. In all, four commercially-available tests were considered. See Footnote 11 for further details.

13. See Footnote 7.

14. As pointed out by Bruce (see Footnote 7), research on sales-aptitude testing apparently goes back to 1928 and originated then in the insurance industry. The origin of the test under immediate consideration ("Sales Comprehension Test, Form M, Revised" (Bruce [1988])) can be traced back to 1946 (Bruce [1978, p. 3]). A discussion of the evolution of the test (focusing primarily on design considerations) from its 1946 origins (up through a 1971 major revision) is also contained in Bruce [1978, p. 3].

15. The AFQT (e.g. see Weitzman [1985]) is composed of four parts (a subset of the ASVAB): the word-knowledge, paragraph-comprehension, arithmetic-reasoning, and mathematical-knowledge tests. The first two parts measure verbal ability (i.e. a soldier's ability to extract and analyze information from written sources), while the latter two parts measure quantitative ability (Eitelberg [1988, pp. 68-74]).

16. Although operations research (OR) historically arose out of the necessity to evaluate the effectiveness of new types of military systems/operations during World War II (see Morse and Kimball [1951, Chapter 3]; also McCue [1990]), a rather cursory examination of major OR textbooks (e.g. Hillier and Lieberman [1967], Wagner [1969]) reveals (with one notable exception (Naval Operations Analysis (NOA) [1977])) absolutely no treatment of system effectiveness/development of measures of effectiveness (MOEs) for any type of system, much less for military systems. This is indeed ironic, since not only did Morse and Kimball [1951, Chapter 3] in their classic and seminal work Methods of Operations Research devote an entire chapter to "The Use of Measures of Effectiveness," but also Herrmann and Magee [1953] have called the measure of effectiveness (MOE) one of the "four concepts of fundamental importance to the practice of OR."

    Any DoD practitioner involved with evaluating military systems can attest to the essential nature of understanding the basic concepts concerning system effectiveness. The simple facts, unfortunately, are that

    (1) **academicians in civilian colleges and universities essentially have no interest in system effectiveness**, and

    (2) **DoD has done a poor job of institutionalizing knowledge about this critical topic** (see Taylor [1983, Preface] for further discussion of DoD problems of institutionalizing such knowledge).

    Consequently, one of the authors here (Taylor) has had to develop his own theory of the measurement of system effectiveness, which unfortunately remains largely unpublished. This theory is based on viewing an MOE as a decision aid (within the context of a specific decision problem) and considering MOE development to be based on the following four fundamental concepts:

    (1) **effectiveness,**

    (2) **decision context,**

    (3) **hierarchy of systems,**

    (4) **measurement.**

    Consideration of the decision context leads one to consider the following aspects:

(1) **problem statement** (question),

(2) **organizational level of decision maker** erspective of decision maker/analyst),

(3) **system** (use systems approach: identify system, supersystem, subsystems),

(4) **alternatives,**

(5) **nature of planning horizon** (i.e. short-term or long-term),

(6) **evaluation/forecasting/modeling approach**,

(7) **threat and the system's operational environment**,

(8) **system effectiveness,**

    (a) qualitative effectiveness concept,

    (b) quantification of effectiveness,

        (i) "combat outcome" MOE,

        (ii) surrogate MOE.

17. The distinction between performance and effectiveness is fundamental, but apparently poorly understood by the operations-research community. Correspondingly, one refers to the corresponding quantifications of these concepts as a measure of performance (MOP) and a measure of effectiveness (MOE). According to Taylor's theory of the measurement of system effectiveness (which is based on considering an MOE to be a decision aid and then on considering the decision context), MOPs refer to a system's inputs and essentially describe the system's capabilities, while MOEs refer to its output (and how this output measures up to the system's goals).

Moreover, the military is composed of hierarchical systems for span-of-control reasons (cf. Wohl [1981], Lomov [1983, pp. 186-189]). Moiseyev [1975, p. 465] points out that hierarchical structure is created for complex systems as a means for human beings to cope with their complexity. Such coping with complexity is caused by the limits of human information processing (Miller [1956]). Irrespective of any theoretical justification, hierarchies of military systems (e.g. see Rudwick [1969, p. 52]) have been created by human trial and error over the course of history. Here (as is usually the case (cf. Rudwick [1969, pp. 52-53])) a system is defined as a set of elements unified in the achievement of a goal (or goals) (and thus behaving as a single entity). Corresponding to a hierarchy of systems is then a hierarchy of goals that must be considered for developing MOEs (which accordingly also appear as a hierarchy of MOEs). Moreover, as pointed out by the Soviet systems analyst Modin [1981, p. 8] (very loose translation given here),

In a hierarchy of systems, the concept of goal is relative: that which is a goal (i.e. target for output) at one level is at the same time the means (i.e. input) for attaining the goal of the next higher-level system.

Thus, the same quantity paradoxically can simultaneously be both an MOP and an MOE, and hence system goals must be clearly understood. Such considerations were used in the development of the MORE used in the work at hand.

18. Before Hernandez [1994, pp. 12-15] clearly stated our final perception of USAREC's goal for a recruiter (from which the choice of MORE unambiguously follows), Buchs [1994, pp. 21-27] also had considered another MORE: cumulative percent success = 100x (total enlistees brought into Army for given period of time)/(total quota of enlistees to be recruited for this period). Buchs's [1994, pp. 50-68] conclusions essentially did not depend on the MORE chosen.

19. We have used here terminology current in the field of personnel selection and management (e.g. see McKenna [1967]). Atwater et al. [1986] use the terminology "concurrent method."

20. Atwater et al. [1986] use the terminology "predictive method." See also Footnote 19 above.

21. Here we are following the terminology of Neter, Wasserman, and Whitmore [1993, p. 240] to denote the fact that judgment was used to infer that, for example, the Baltimore Battalion of the First Recruiting Brigade is representative of an "outstanding" recruiting battalion.

22. The battalions in question were the **Baltimore Battalion of the First Recruiting Brigade** and also the **Santa Ana Battalion of the Sixth Recruiting Brigade**.

23. Here we are essentially using Neter, Wasserman, and Whitmore's [1993, p. 240] definition of judgment sample: A sample for which judgment is used to select representative elements from the population or to infer that it is representative of the population is a **judgment sample**. See Footnote 21 above and also Neter, Wasserman, and Whitmore [1993, p. 240] for further information.

24. The control group consisted of all attendees of a Basic NCO Course (BNCOC) held at Fort Knox, Kentucky in February 1994.

25. The abbreviation "TTE" stands for "Transitional Training and Evaluation." The so-called TTE Program follows graduation from the Army Recruiting Course (ARC) and essentially provides transition to field-force recruiting (see USAREC [1989, p.140] for further details; also Appendix A). The term "TTE period" then refers to the initial nine months of the 36-month recruiting tour of duty after graduation from the ARC (see Appendix A).

26. Hernandez [1994, Appendix A (pp. 75-91)] actually gives the entire database (for all 276 recruiters) that was used by Buchs [1994] for most of his analyses (except those involving the BNCOC data). With this database, these analyses of Buchs can be recreated.

27. So far, no test score has been identified as belonging to a recruiter classified as "unsuccessful" (see Appendix A for a definition of terms) by USAREC.

28. Some of the statistical-analysis results given in Section 3.1 were developed specifically for the writing of this report. The origin of these results will not be specifically identified, but some key aspects will be highlighted in footnotes.

29. As USAREC policy regarding recruiter management (i.e. the mission [goals] assigned to recruiters) changes, the measure of recruiter effectiveness (MORE) may have to be changed. In particular, station missioning may well require a different MORE for evaluating recruiter performance.

30. Buchs [1994] also reports P-values (e.g. see Weiss and Hassett [1991, pp. 449-450]) (observed significance levels) for essentially all hypothesis tests.

31. Normality of the underlying populations from which samples were drawn has essentially been established by Buchs [1994]. Equality of normal-population variances for recruiters and non-recruiters was investigated with a two-sided F-test (e.g. see Neter, Wasserman, and Whitmore [1993, pp. 417-421]). Denoting non-recruiters as population 1 and recruiters as 2 and using $\alpha = 0.05$, we compute the observed value of the test statistic $F_{test} = (s_1/s_2)^2 = 1.95 > (F_{crit})^{upper} = 1.4761$, where $(F_{crit})^{upper}$ denotes the upper critical value of the test statistic for a two-sided test. Hence, the null hypothesis (equality of variances) is rejected at a significance level = 0.05. Also, the observed value of the test statistic corresponds to a P-value (observed significance level) equal to 0.0006, which (as it should be) is less than the significance levelα. Investigating equality of means for large samples from arbitrary (i.e. variances not necessarily equal) populations, we compute the observed value of the test statistic $z_{test} = (\overline{X}_1 - \overline{X}_2)/s\{\overline{X}_1 - \overline{X}_2\} = 6.32 > (z_{crit})^{upper} = 1.960$, where $s\{\overline{X}\}$ denotes the estimated standard error of the mean. This result is extremely highly statistically significant, corresponding to a P-value < 0.000001. Hence, the null hypothesis of equality of means is handily rejected (as even casual inspection of Table IV indicates that it should).

32. Here we mean testing at additional, subsequent, selected points in time during the career of a recruiter.

33. See Hernandez [1994, p. 65].

34. In many discussions with recruiting leaders, the point emerged frequently that soldiers with combat-arms PMOSs had a tendency to be more mission-oriented than those not directly involved with combat in their jobs and therefore had greater success in making mission as a recruiter.

35. See, for example, Neter, Wasserman, and Whitmore [1993, pp. 606-607] for a discussion of the **coefficient of multiple correlation**. The **coefficient of simple correlation** is discussed on pp. 557-558 of this text (see also Weiss and Hasset [1991, p. 622]).

36. For all Hernandez's [1994] significance tests, a significance level of $\alpha = 0.10$ was used.

37. See Footnote 32 above.

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Appendix A: Systems Analysis for Recruiter Selection and Training

The U.S. Army Recruiting Command (USAREC) meets its mission requirements to provide manpower for active Army units by operating in a mode unique to Army Major Commands (MACOMs). Key to the successful accomplishment of its mission is the selection and training of capable recruiters. This Appendix outlines this selection and training process and concludes by suggesting strategies for implementing the Sales-Comprehension Test within that process. Figures 1 and 2 below provide a visual guide for the following paragraphs.

The majority of recruiters are selected from enlisted non-commissioned officers (NCOs) in the grade of E5 and E6. These soldiers serve in essentially all Military Occupational Specialties (MOSs) and are selected in accordance with Army Regulation (AR) 601-1, Assignment of Enlisted Personnel to the US Army Recruiting Command. This regulation provides an initial screening for potential recruiters and eliminates individuals with obvious undesirable characteristics such as financial hardship or educational deficiencies. A soldier meeting the 601-1 criteria can volunteer for recruiting duty. There are a certain number of incentives for volunteering such as accelerated promotions and preference for location of assignment. Since these individuals are motivated for their future recruiting duties, USAREC desires that the majority of future recruiters are volunteers. Although the number is increasing, only 10% of the recruiter field force enters in this manner. The remaining 90% are nominated by their particular career branch. This is a personnel decision where the Army's Personnel Command makes the selection based upon the AR 601-1 guidance and the availability of soldiers for reassignment to USAREC. Because duty as a recruiter is not considered a "good" assignment, soldier motivation greatly varies. AR 601-1 selection criteria are presented in Appendix B.

Regardless whether the soldier volunteered or was nominated, AR 601-1 requires that the soldier be given a personal interview with the first Lieutenant Colonel (LTC) in the soldier's chain of command. The purpose of this interview is to further eliminate soldiers who may be inappropriate for recruiting duty. The interview requires the LTC to insure that all the specified AR 601-1 criteria are met and then further examines the soldier's motivational and interpersonal communicative skills. The hope is that this mid-level manager has the balance between understanding the Army's needs for quality recruiters and personal knowledge of that particular soldier's potential. This interview is not determinative in itself, but rather is forwarded along with the soldier's application package to the Army Personnel Command (PERSCOM). However, it would be very unlikely that a soldier would be selected for recruiting duty contrary to the LTC's recommendation. PERSCOM then makes the final selection of potential recruiters in accordance to the needs of the Army.

All soldiers who volunteered and those who were nominated must attend the Army Recruiting Course (ARC). This is an extensive six week training period presently conducted at Fort Benjamin Harrison, Indiana (ARC will move to Fort Jackson, South Carolina in early 1995). The school serves as a transition from the soldier's previous MOS training and provides him with the initial background necessary to become a successful recruiter. About 3% of the soldiers do not complete the course and are reassigned outside of USAREC. It is worth noting that ARC is operated by Training and Doctrine Command (TRADOC) not by USAREC. There is a close association between ARC and USAREC as all the instructors have previously been successful recruiters and there is close coordination with USAREC as to the instructional content of ARC. Upon graduation from ARC the recruiter is awarded the Recruiter Badge prior to initial assignment as a new recruiter.

A new recruiter is detailed to a 36 month period in USAREC. The initial nine months is designated as the Transitional Training and Evaluation (TTE) period. TTE represents an intensive training period intended to supplement the training from ARC. During the TTE a soldier can also be found to be unsuitable for recruiter duty in which case he would be reassigned to duties within his MOS. Approximately 4% attrite from the recruiter pool (all recruiters) in this manner.

After completion of TTE, the soldier becomes a field force recruiter for the remaining 27 months in USAREC. A recruiter can be eliminated from the field force by three methods as specified by AR 601-1. A recruiter can be relieved without prejudice. This reassignment is not considered to have an adverse career impact as the other two methods. This category of elimination is intended for personnel unable to meet the required recruiting criteria specified in AR 601-1 through no fault of their own. Such things as recent physical or medical limitations, an adverse change in financial status, or a change in the soldier's family situation are categorized into this type of separation action. A recruiter can be reassigned due to ineffectiveness. A soldier would be placed in this category if he failed to respond to training, performance counseling and other guidance. Ineffective relief candidates require sales technique training and documented counseling before the relief can be substantiated. Additionally, a recruiter can be relieved for ineffectiveness due to failure to meet assigned production standards or necessary sales ability. Prior to relief the soldier must have been given remedial training and counseling. AR 601-1 provisions allow that this means of relief can also be used for recruiters who fail to attain an adequate knowledge of regulations, programs, policies and procedures related to recruiting duty or for a failure to adequately train subordinates. The final method for relief is for unsuitability. This category includes those recruiters who committed an illegal recruiting practice, breached a civil law, failed to pay just debts or failed to maintain acceptable standards of appearance (including physical fitness). The numbers of reliefs for FY 1990 to FY 1992 compared to the total assigned strength is given in Table A-I below.

At the completion of the 36 month assignment a recruiter has the opportunity to select the OOR MOS and remain a recruiter for subsequent assignments. If he chooses not to remain as a recruiter, the soldier will be reassigned in his MOS. A very real concern, but one not addressed in this report is a soldier that once he leaves USAREC is no longer competitive for retention in the Army due to a "bad" efficiency rating while in USAREC.

Table A-I. Number of Recruiter Reliefs by Category for USAREC in FY 1990 to FY 1992

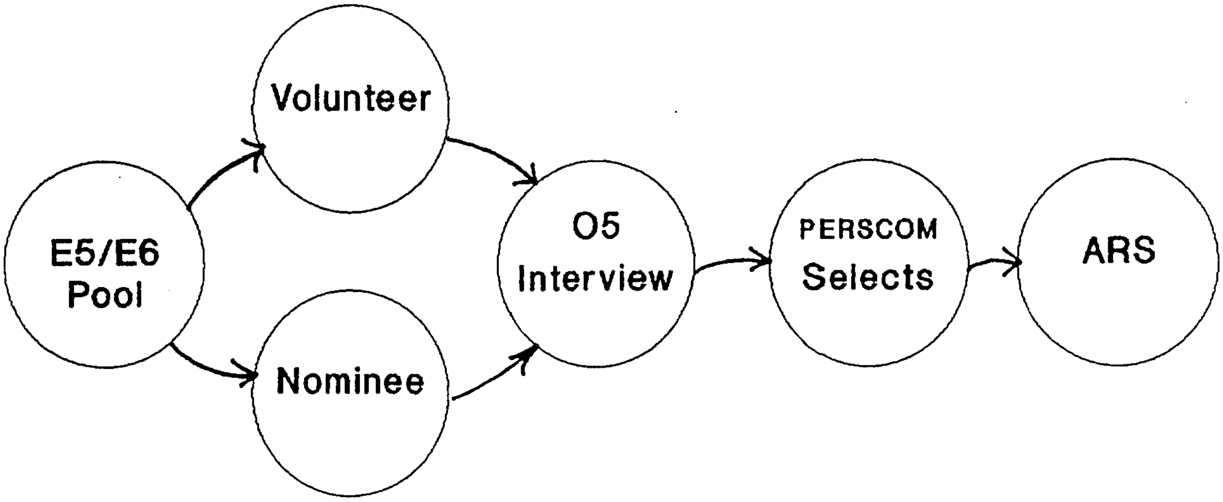
Category of Relief	FY1990	FY 1991	FY1992
New Recruiter (TTE-Period Failure)	350	336	158
Ineffectiveness	243	148	51
Unsuitability	104	152	57
Unqualified (Relieved without Prejudice)	79	66	43
Total Number of Reliefs	776	702	309
Total USAREC Assigned Strength	7639	7006	6576

There are several strategies for using the Sales-Comprehension Test described in the main body of this report. The test could be given by the "Recruite the Recruiter" Team. The test is easy to administer takes a short time (approximately 20 minutes) to complete, and can be graded quickly. The test could be given as soldiers waited for their interviews with the Recruiter team. The results would give the recruiter immediate information that could substantiate the "gut feel" about the soldier from the interview. Certain borderline cases might be resolved with this additional information. Another possible strategy would be to give the test to all Basic NCO Courses (BNOCs). This military school is composed of soldiers in the E5 pool and giving the test there could forecast soldiers with a potential to be good recruiters. These soldiers could be identified for the Recruit the Recruiter team as "high potential" candidates. Finally, the test could be administered as part of the inprocessing at ARC. Soldiers with low scores could be given more intensive training or be reassigned.

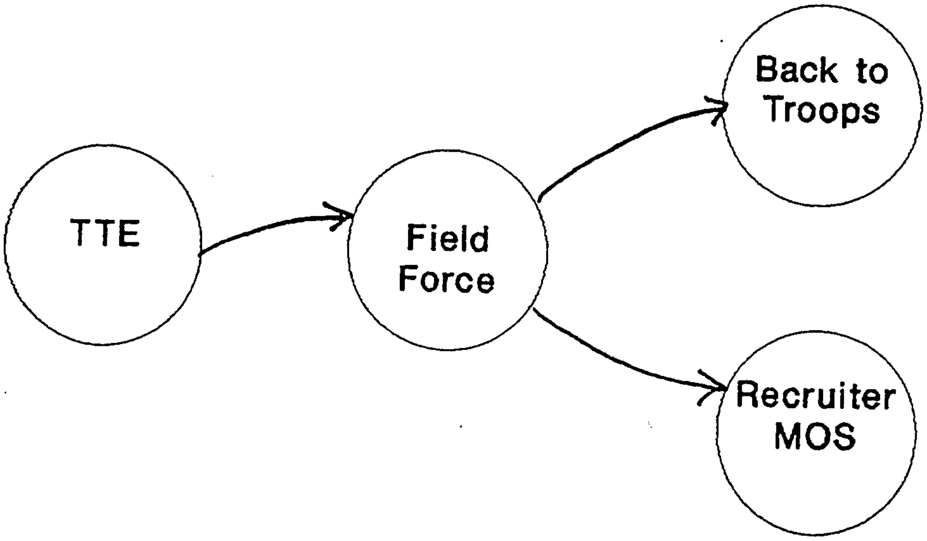
Figure A - I

Recruiter Selection

Pre Badge


Volunteer
E5/E6 Pool
O5 Interview
PERSCOM Selects
ARS
Nominee

Post Badge


Back to Troops
TTE
Field Force
Recruiter MOS

Appendix B: Recruiter Selection Criteria

To qualify for selection as a US Army recruiter, either as a volunteer or as a DA selected recruiter, a soldier must:

1. Be a citizen of the United States.

2. Be a high school graduate with diploma or have 1 year of college with a high school General Education Development (GED) (No waiver). College Level Entrance Program (CLEP), Department of the Army Non-Resident Testing Education System (DANTES) and military service credit do not apply.

3. Have a minimum GT score of 110 waivable to 100 with an ST score of 100.

4. Be at least 21 years old, but not more than 35 years old at time of selection.

5. Be a SGT, SSG, or SFC. (A SFC may not have more than 2 years time in grade at the time of selection). SSG(P) or SFC must be an Advanced Noncommissioned Officer Course (NCO) graduate (No waiver)). (A SSG must be a COC graduate). (A SGT must be a Primary Leadership Development Course (PLDC) graduate (No waiver)).

6. Have no less than 4 years time in service and no more than 8 years time in service if a SGT no more than 12 years time in service if a SSG, or no more than 14 years time in service if a SFC.

7. Have completed 1 year of service since reclassification per AR 600-200.

8. Not be currently assigned to the Military Entrance Processing Command (MEPCOM).

9. Meet the height and weight standards of AR 600-9 or possess a medical determination of acceptable body fat limits (No waiver).

10. Have a minimum physical profile of 13221. (No shaving profile).

11. Have no lost time during the current enlistment or in the past 3 years, whichever is longer (No waiver).

12. Possess or be able to obtain a valid driver's license. Assignment as a recruiter involves an extensive amount of automobile driving. Individual must have no record of careless, reckless, or unsafe driving.

13. Possess excellent military appearance and bearing, and have no obvious distracting physical abnormalities or mannerisms. Must not have any lewd or offensive indelible marks or figures (tattoos) visible upon the exposed arm while wearing the prescribed duty uniform, to include the physical training uniform.

14. If married to another soldier, have a spouse who will concurrently apply and be qualified for assignment with USAREC.

15. Not currently nor have been previously enrolled in the past 12 months in a drug or al dependency intervention program of any type. (No waiver is authorized).

16. Not be pregnant at time of selection or prior to attendance at the ARC.

17. Have completed the period of stabilization in the current assignment.

18. Have favorable civilian and military disciplinary records. Have no unfavorable alcohol related incidents within the past 5 years upon attendance at the ARC. Examples of such disqualifying conduct are driving under the influence (DUI), driving while intoxicated (DWI), or charged with drunk and disorderly conduct.

19. Never have been convicted by civilian court or military court-martial.

20. Never have had action taken (including proceedings under the provisions of Article 15, Uniform Code of Military Justice (UCMJ) by any authority for: (a) An offense which the maximum penalty under the UCMJ is death or confinement for 6 months or more (No waiver authorized); (b) Any offense that involves moral turpitude regardless of sentence received. (No wavier authorized).

21. Be in receipt of EDAS assignment instruction to USAREC with TDY enroute to the Army Recruiting Course constitutes authority for eligible personnel to extend or reenlist under AR 601-280, paragraph 3-1. Approval to delete or defer a soldier from these AI is reserved or the CDR, PERSCOM, ATTN: TAPC-EPM-A.

22. Have no marital, emotional, or major medical problems (to include immediate family) that would hamper performance on recruiting duty. Recruiting duty involves assignment to geographic areas that are away from military medical facilities. Soldiers enrolled in the Exceptional Family Member Program may serve as a recruiter. Every effort will be made to assign them near a military installation or in a civilian community where definitive medical care for their family member is available.

23. Not be a sole parent (No wavier).

24. Not have more than two dependents (to include spouse) if a SGT, three dependents (to include spouse) if a SGT(P), four dependents (to include spouse) if a SSG, or five dependents (to include spouse) if a SFC.

25. Be financially stable. Have not filed a petition claiming bankruptcy within 5 years and not currently responsible for making any payments as a result of any such action. The financial situation of soldiers being considered for selection will be closely scrutinized

for soldiers who submit a DA Form 5425-R (Applicant/Nominee Personal Financial Statement).

26. If a volunteer is serving a dependent restricted tour, the soldier must waive his entitlement to the home base/advance assignment program.

27. Have a minimum TIS remaining of 3 years following the completion of the Army Recruiting Course.

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